REMARKS

Claims 29-30 and 32-49 are pending. Claims 38 and 46 have been amended. Reconsideration of the application in view of the amended claims and remarks provided below is respectfully requested.

§103 Rejections

Paul in view of Leathers

The Examiner rejected Claims 29-30 and 32-49 under 35 U.S.C. § 103(a) as being unpatentable over US Patent 5,141,858 ("Paul") in view of US Patent 5,702,942 ("Leathers"). Applicants respectfully assert that the Examiner's modification of Paul's teachings is improper. The Examiner has also made note of a Ph. D. dissertation by Cote, G.L. ("Cote dissertation") in the Office Action.

Independent claim 29 of the present invention recites a process for preparing a sweetener comprising combining sucrose, an acceptor molecule, and a glucansucrase enzyme so as to prepare a sweetener having at least 20% alpha 1-3 linkages and at least 20% alpha 1-6 linkages, wherein the ratio of sucrose to acceptor molecule is at least 8:1.

Independent claim 44 of the present invention recites a process for preparing a sweetener comprising combining sucrose, an acceptor molecule, and a glucansucrase enzyme so as to prepare a sweetener having at least 20% alpha 1-3 linkages and at least 20% alpha 1-6 linkages, wherein the ratio of sucrose to acceptor molecule is in the range of from 8:1 to 19:1.

As described in Applicant's previous Office Action responses, the ultimate aim and teaching of Paul is not only to create oligodextrans having α,1-2 linkages, but also to maximize the

concentration of oligodextrans having α,1-2 linkages in the final product. It is well established in the art that oligodextrans with these α,1-2 linkages are non-digestible. As Paul describes, this quality of non-digestibility allows the product of Paul to be used as a filler or extender. Therefore, producing oligodextrans with α,1-2 linkages is an integral and critical feature of Paul. It would defeat the fundamental purpose of Paul to utilize an enzyme source which produces oligodextrans with no α,1-2 linkages. The Examiner has proposed just such a modification of Paul.

Applicants had, in the prior Office Action response, asserted to the Examiner that a combination of Paul and Leathers was improper under MPEP 2143.01 V. "If proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." (MPEP 2143.01 V., citing *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984)).

The purpose of Paul is to create oligodextrans with α,1-2 bonds and to maximize the concentration of such oligodextrans. Leathers discloses a strain, 21297, which produces glucansucrase which produces oligosaccharides with no α,1-2 bonds. Thus, the Examiner suggests a modification to Paul which would result in oligodextrans which lack the very α,1-2 bonds which Paul explicitly states a desire for throughout its disclosure, thereby rendering Paul unsatisfactory for its intended purpose.

In the Office Action, the Examiner responded to the Applicants arguments stating that "the strain disclosed by [Leathers] has both activities i.e. alternansucrase and dextransucrase. Therefore, modifying [Paul] by replacing the strain with the strain disclosed by [Leathers] (B-21297) would still produce alpha, 1-2 bonds in the products to a lesser extent." (Office Action, Response to Arguments, para. 1a, emphasis added). It is also noted that the Examiner cites Cote, which the Examiner states discloses optimization of donor to acceptor molecule ratios for alternansucrase enzyme. Applicants will address both of these issues.

Applicants respectfully assert that Examiner's response to Applicants arguments is simply erroneous. The Examiner has stated that strain 21297 "still has dextransucrase activity therefore, the alpha 1-2 bonds will be produced to a lesser extent..." (Office Action, para. 17). Therefore, the Examiner states that incorporating strain 21297 into Paul will not make Paul unsatisfactory for its intended purpose because some alpha 1-2 bonds will still be produced.

Contrary to the Examiner's assertions, dextransucrase activity does not equate to the existence of alpha 1-2 bonds. Alternansucrase activity refers to activity that catalyzes a chemical reaction that transfers α-d-glycosyl residue alternately to the 6 and 3 positions thereby creating a glucan with alternating α-1-6 and α-1-3 bonds (alternan). Dextran, on the other hand, has a backbone of α-1-6 linked units, but can have side chains which are attached by α-1-3, α-1-4, or α-1-2 bonds, depending on the origin of the dextransucrase activity. Particular bacterial strains can have both alternasucrase activity and dextransucrase activity.

It is important to appreciate that different strains produce different linkages and different ratios of these linkages in glucans. The fact that a particular stain has some dextransucrose activity does not indicate that it will produce α-1-2 bonds. Applicants have attached an article, published in 2001, for the Examiner's reference: Homopolysaccharides from lactic acid bacteria, International Dairy Journal, (2001) 675-685 ("International Dairy Journal Article"). As described above and in the International Dairy Journal Article, dextransucrase produces a glucan with α-1-6 bonds in the main chain, but degree of branching involving α-1-3, α-1-4, or α-1-2 bonds varies according to the origin of the enzyme (the strain it came from). (International Dairy Journal Article, page 680).

Applicants refer the Examiner to Table 1 of the International Dairy Journal Article (page 680) which clearly lists the structure of different glucans produced by various examples of *Leuconostoc mesenteroides* strains. As is clearly seen in the table, strains 742 and 1355 do not

produce any α-1-2 bonds. However, these strains produce the claimed percentages of α-1-3 and α-1-6 bonds of the present invention. Strain 1299, on the other hand, is unmistakably shown to produce significant percentages of α-1-2 bonds. It is the particular strains themselves which determine what type of linkages are produced in a glucan, and in what ratios.

Like strains 1355 and 742, strain 21297 also does not produce any α-1-2 bonds. Applicants also note that none of the strains listed in currently amended claims 38 or 46 (depending from claims 29 and 44 respectively) produces glucans with any α-1-2 linkages.

Contrary to the Examiner's assertion in the Office Action, strain 21297 of Leathers (or any of the other strains currently listed in dependant claims 38 and 46) will not produce glucans with any α-1-2 linkages. Thus, the Examiner's modification of Paul would result in a product without the very α,1-2 linkages which are intended by Paul. Consequently, Examiner's modification of Paul is improper because it would render Paul unsatisfactory for its intended purpose.

The Examiner has also made note of the Cote dissertation in the Office Action. The Cote dissertation includes a general statement regarding the ratios of acceptor to sucrose (at page 77). Importantly, the ratio of sucrose to acceptor actually utilized by Cote is approximately 1:2. (see Cote, page 56) Cote uses more than twice the amount of acceptor compared to sucrose. This ratio is substantially different than that claimed by the present invention. Claim 29 claims a ratio of sucrose to acceptor greater than 8:1, and claim 44 claims a ratio of from 8:1 to 19:1. The ratio of sucrose to acceptor actually used in the Cote dissertation is not remotely close to any of the claimed ratios.

The Examiner has proposed a modification of Paul (with a strain disclosed in Leathers) which renders Paul unsatisfactory for its intended purpose. Because the Examiner's modification of

Paul is improper, Applicants respectfully submit that the present invention is patentable over Paul in view of Leathers.

Kossmann in view of Leathers

The Examiner also rejected Claims 29-30 and 32-49 under 35 U.S.C. § 103(a) as being unpatentable over WO 00/47727 ("Kossmann") in view of US Patent 5,702,942 ("Leathers"). Applicants respectfully assert that the combination of Kossmann and Leathers would not result in the claimed invention.

As acknowledged by the Examiner in the Office Action, Kossmann does not disclose the sucrose to acceptor ratios of the present invention. (Office Action, para. 24). Thus, the combination of the strain of Leathers (21297) with Kossmann does not result in the claimed process. The Examiner has sought to remedy the deficiency of Kossmann by noting that the Cote dissertation discusses acceptor to sucrose ratios. The Examiner further states that it would be obvious to optimize the donor to acceptor ratios based on the Cote dissertation. As described above, however, the actual ratio utilized by the Cote dissertation is 1:2 sucrose to acceptor ratio, a ratio that is not remotely close to what is claimed by the present invention.

Applicants submit that the combination of Kossmann and Leathers does not teach a process in which the ratio of sucrose to acceptor molecule is at least 8:1. The present invention represents a drastic departure from the teachings of Kossmann, Leathers, and Cote. The Examiner has not explained why an ordinarily skilled worker would utilize sucrose to acceptor ratios which so drastically depart from these references. Moreover, the present invention clearly sets forth the surprising advantages of utilizing this significantly higher ratio of sucrose to acceptor molecule – advantages neither recognized nor contemplated by Kossmann, Leathers, or Cote.

The inventors of the present invention surprisingly discovered that a process utilizing greater that an 8:1 ratio of sucrose to acceptor molecule results in a sweetener which is fully caloric, and has a glucose release rate significantly reduced as compared to product made with a 4:1 ratio or less of sucrose to acceptor molecule. (See specification, pg. 13). Moreover, a process utilizing greater than 8:1 ratio of sucrose to acceptor molecule results in a sweetener which is much improved at lowering the glycemic index of a food product to which it is added. (See specification, pg. 15). These important benefits are neither recognized nor contemplated by Examiner's cited references.

Because the combination of Kossmann and Leathers does not result in the present invention, Applicants respectfully submit that the present invention is patentable over Kossmann in view of Leathers.

Conclusion

For at least these reasons, Applicants assert that the pending claims are patentable and respectfully request that the rejection under 35 U.S.C. § 103(a) be withdrawn.

Please apply any charges or credits to deposit account 50-2342.

Respectfully submitted,

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